Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Request by LoJack Corporation for a Partial Waiver of Section 90.20(e)(6) and Part 2 of the Commission's Rules	)	WT Docket 06-142
	)	
	)	
	)	

To: The Commission

Petition for Reconsideration of Hammett & Edison, Inc., Consulting Engineers

This filing is in response to the Commission's September 14, 2011, *Declaratory Ruling and Order,* concerning Stolen Vehicle Recovery System (SVRS) stations at 173.045 MHz.

I. The WT Docket 06-142 Record Does Not Support the Declaratory Ruling and Order

1. The Declaratory Ruling and Order (DR&O) contains two aspects that are not supported by the docket record: First, that increasing the universe of SVRS eligible licensees from only police licensees, to all Part 89 Public Safety licensees, would not increase the use of LoJack signals. Public Safety eligibility extends to:

Hospitals
Parties providing medical services to the public on a secondary basis, such as clinics and public health facilities
Ambulance companies
Rescue organizations
Physicians, oral surgeons, schools of medicine
Persons with disabilities
Veterinarians and veterinary clinics
Disaster relief organizations
School Bus operators
Beach Patrols
Persons or organizations existing in isolated areas

2. The above list of eligible entities is shown in the same order as given in Section 90.20 (Public Safety Pool) of the FCC rules. To conclude that such a massive expansion of entities

eligible to make SVRS transmissions "will not increase the potential for interference"[1] is not logical.

3. In its July 20, 2011, filing to renew its KS2XBH experimental license for operations on 173.045 MHz, LoJack Corporation (LoJack) stated:

> Understanding that LoJack SVRS network would continue to be expanded throughout the United States, LoJack has viewed a permanent nationwide authorization as more representative of the true need it has for the use of its equipment. As intentional radiators that are ultimately authorized under Part 90 of the Commission's rules, LJU's are not permitted to operate under the Commission's generic demonstration rules absent experimental authority.

Thus, there is every reason to expect that LoJack will continue its approach of ever expanding use of 173.045 MHz, sometimes via an explicit rulemaking (*e.g.*, the July 24, 2006, WT Docket 06-142 Notice of Proposed Rulemaking), and other times by waiver requests (*i.e.*, the instant DR&O, giving LoJack what it was unable to obtain in the earlier NPRM and resulting August 13, 2008, Report and Order).

4. The other problematic portion of the DR&O is the conclusion that a SVRS signal operating just below TV Channel 7 will be incapable of causing interference to DTV reception. The DR&O bases this on the claim that the desired-to-undesired (D/U) protection ratio for a lower-adjacent DTV signal into a DTV signal was -33 dB (it is actually -28 dB), versus -14 dB for a lower-adjacent DTV signal into an analog receiver.[2] The DR&O concluded that this meant that a DTV signal had 19 dB better immunity to a lower-adjacent channel interfering signal, thus more than offsetting the 17 dB lower protected signal level. But because the lower DTV-into-DTV protection ratio is really -28 dB, this argument, which is flawed, anyway, is already in error by 5 dB, and leaves a 3 dB shortfall instead of a 2 dB advantage.

5. As noted in the prior paragraph, the lower-adjacent DTV-into-DTV protection ratio is -28 dB.[3] That is, interference is only predicted to occur to a DTV signal when a lower-adjacent DTV signal is 28 dB or more stronger. As pointed out in earlier H&E filings,[4] the VHF high band DTV protected contour is the F(50,90) 36 dBu, versus the former VHF high band Grade B protected contour of F(50,50) 56 dBu. After allowing for the different time variability between

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1 DR&O, at paragraph 17.
2 DR&O, at paragraph 18.
3 February 6, 2004, OET-69, Table 5A. This is still the most recent version posted on the OET web site.
4 H&E comments on February 8, 2011, and H&E reply comments on February 18, 2011.

F(50,90) and F(50,50), the VHF high band DTV signal is 17 dB weaker than its previous analog counterpart. SVRS power levels have not been reduced by 17 dB. In the WT 06-142 R&O, the Commission allowed SVRS base stations to increase power by 2.2 dB, from 300 watts effective radiated power (ERP) to 500 watts, and allowed SVRS mobile transmitters to increase power by 3 dB, from 2.5 watts ERP to 5.0 watts.

6. The problem, of course, is that an interfering LoJack signal is neither a 6 MHz wide analog signal, nor a 6 MHz wide digital signal.[5] It was for this reason in 1982 that OET had to develop protection criteria for narrow band Part 83 Inland Waterways signals just above TV Channel 13, and in 1989 OET found that the protection criteria for Inland Waterways signals was similarly applicable for gauging the interference potential of a narrow band 173.045 MHz SVRS signal into an analog TV Channel 7 signal. The Commission thus adopted the MicroLogic report[6] and methodology as the template for SVRS base stations to use to demonstrate protection of analog TV Channel 7 stations.[7]

7. So, the LoJack base station signal employing 20K0F2B emissions, and the 13K0F2D[8] LoJack mobile station signal, is not akin to an analog TV signal. This means that the DR&O's reliance on Office of Engineering and Technology (OET) Report 07-TR-1003, *Interference Rejection Thresholds of Consumer Digital Television Receivers Available in 2005 and 2006* (OET Report), is flawed.

8. Although the OET Report states, in its page viii Executive Summary, that OET tested 30 consumer-grade DTV receivers, the study was only to determine whether the receivers were single-conversion or double-conversion (all turned out to be more-interference-susceptible single-conversion receivers). At page 1-4, one learns that *interference testing* was done on only ten receivers, and at page 2-3, one further learns that the full scope of the interference tests was

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5 It is understood that the 3 dB bandwidth of a U.S. 8-VSB digital signal, ignoring the DTV pilot, is 5.38 MHz, as reported throughout the March 30, 2007, OET Report 07-TR-1003, cited in the DR&O; however, the nominal 6 MHz DTV channel width will be used in this filing.

6 *Test Report on Potential for Interference to the Reception of Television Channel 7 Signals by Lo-Jack Transmissions* (October 1985).

7 See Footnote 22 of the October 16, 1989, General Docket (GD) 88-566 Report and Order (R&O).

8 These emission designators are specified by LoJack Corporation in the KS2XBH experimental license. We further note that at paragraph 51 of the August 13, 2008, WT Docket 06-142 R&O, the Commission decided that SVRS operators may use any type of emission within the authorized bandwidth.

made on just eight receivers. Further, no tests at all were done on coupon-eligible converter boxes (CECBs).

9. The vast majority of the OET testing was based on analog-into-DTV, and DTV-into-DTV testing; that is, one 6 MHz wide TV channel into another 6 MHz wide TV channel. Attached Figure 1 shows two representative spectrum figures from the OET Report. Although there was limited testing of a hypothetical Lower 700 MHz band interfering signal into a DTV Channel 51 receiver, that interfering signal was assumed to be a 1 MHz wide, noise-like signal.[9] A LoJack signal is not a 1 MHz wide, noise-like signal; it is a narrow band, concentrated energy signal. Further, as shown in OET Report Figure 7.1, at some frequencies a 1 MHz wide, noise-like signal was a greater interferer than a 6 MHz wide DTV signal. Therefore, the OET Report demonstrates that there is no basis for the optimistic assumptions made in the DR&O, such as that measurements at UHF would apply equally to measurements at VHF.[10] Indeed, although the OET Report did not include any VHF testing, the report does note that a prior OET investigation of DTV receiver performance for Satellite Home Viewer Extension and Reauthorization Act of 2004 (SHVERA) purposes[11] did include some VHF testing (for receiver sensitivity). But the OET Report notes, at page 5-4, that the SHVERA Report found that:

> The spread between the most-sensitive and least-sensitive receivers was larger in the VHF band-- as high as 15 dB.

Thus, the OET Report cited by the DR&O provided a realistic warning about extrapolating UHF measurements to VHF, which the DR&O not only ignored, but adopted in its conclusion the opposite of what the OET Report implied.

II. The DR&O Would Allow More Than a Twenty-Fold Increase in the Duty Cycle of SVRS Signals Since the Time the MicroLogic Report Was Adopted

10. The duty cycle for SVRS signals at the time of the 1985 MicroLogic Report, which the Commission adopted in 1989 as the benchmark for SVRS-into-TV Channel 7 interference studies, was one 1.8-second transmission every 300 seconds. In the 2008 WT Docket 06-142

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9 OET Report, at page 2-1, and at page 2-2, Table 2-1, third line.

10 DR&O, at page 9, footnote 88. Although that footnote in turn cites the OET Report at page ix and page A-2 of Appendix A, neither citations contain any language claiming, implying, or suggesting that measurements at UHF could be used to predict the DTV receiver's performance at VHF.

11 *Tests of ATSC 8-VSB Reception Performance of Consumer Digital Television Receivers Available in 2005*, OET Report TR 05-1017, November 2, 2005 ("SHVERA Study").

R&O, the Commission extended that duty cycle to 7.2 seconds every 300 seconds. Now the DR&O further increases the duty cycle to 1 second every 8 seconds, or more than a twenty-fold[12] increase (13 dB) in the duty cycle from the MicroLogic Report days. Combined with the lowering of the VHF high band protected contour from the F(50,50) 56 dBu to the F(50,90) 36 dBu, such an increase in the interference potential to reception of an all-or-nothing DTV signal cannot be justified on this docket record until such time as the Commission completes an updated study of the interference potential of a narrow band SVRS signal to DTV Channel 7.

III. Summary

11. The docket record in this proceeding does not support the decisions reached in the DR&O. It would not be in the public interest to allow a massive expansion of eligible users of SVRS signals, and a more than twenty-fold increase in the duty cycle of a LoJack signal, until such time as OET has completed an updated study of the impact of narrow band LoJack signals at 173.045 MHz to reception of DTV Channel 7.

[12] From 1,800 mSec in 300 seconds transmission time to 1,000 mSec in 8 seconds is a 20.8 times increase in the transmission time that would be allowed in a 300 second window; that is, from 1,800 mSec to 37,500 mSec.

IV. List of Figures

12. The following figures or exhibits have been prepared as a part of these WT Docket 06-142 Petition for Reconsideration:

1. Spectrum figure excerpts from the OET Report

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October 3, 2011

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WT Docket 06-142: Stolen Vehicle Recovery Systems
H&E Petition for Reconsideration of the Commission's
September 14, 2011, Declaratory Ruling and Order

Representative Spectrum Figures from the Cited OET Report 07-TR-1003

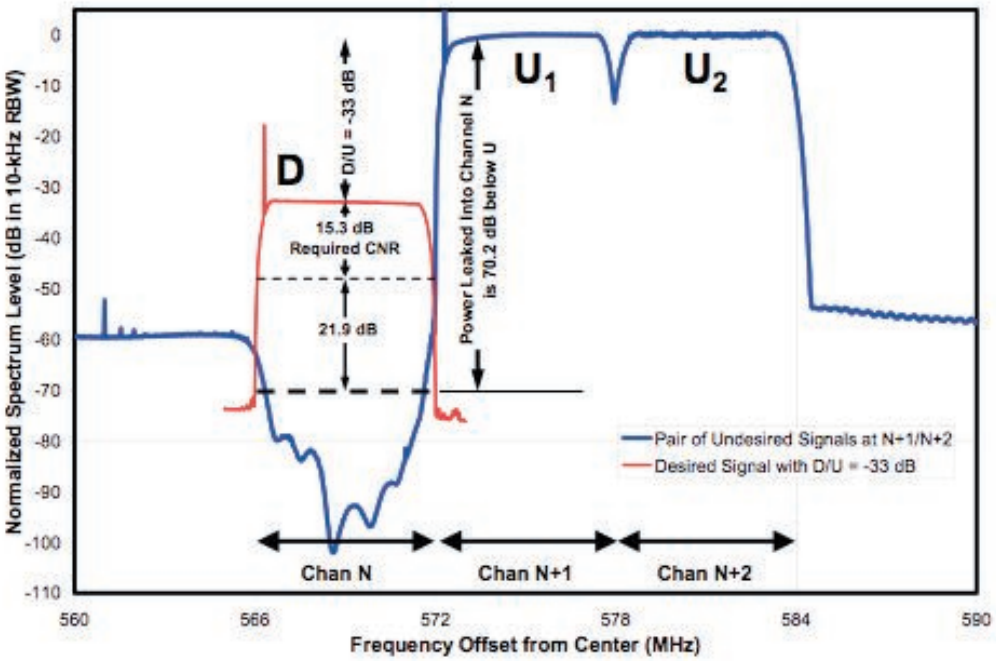

Figure 4-4. Leakage of U pair at N+1/N+2 into Channel N (30)

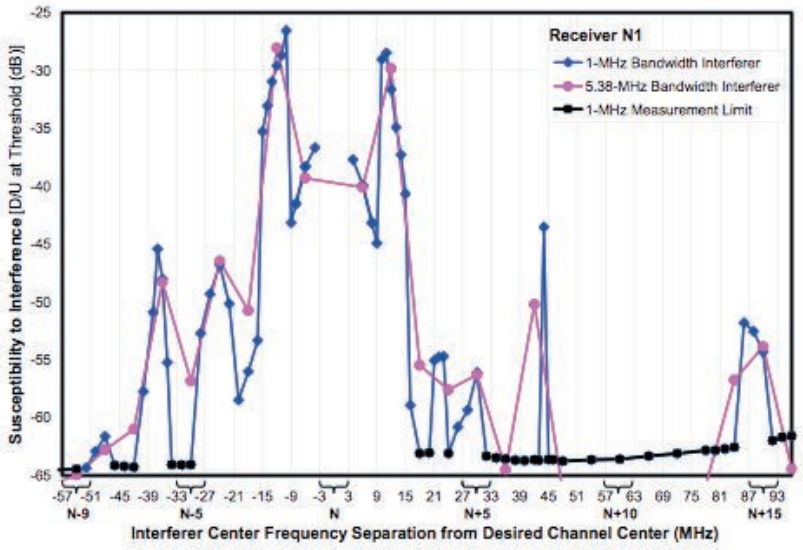

Figure 7-1. D/U With 1-MHz Undesired Signal Bandwidth